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(71) Applicant
SKF GmbH

(Incorporated in the Federal Republic of Germany)

D 8720 Schweinfurt 1 Durchwah 1 09721-56
Federal Republic of Germany

(72) Inventor
Gunter Neder

(74) Agent and/or Address for Service
Mathys & Squire
10 Fleet Street, London, EC4Y 1AY, United Kingdom

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GB 1007191 A

(58) Field of search
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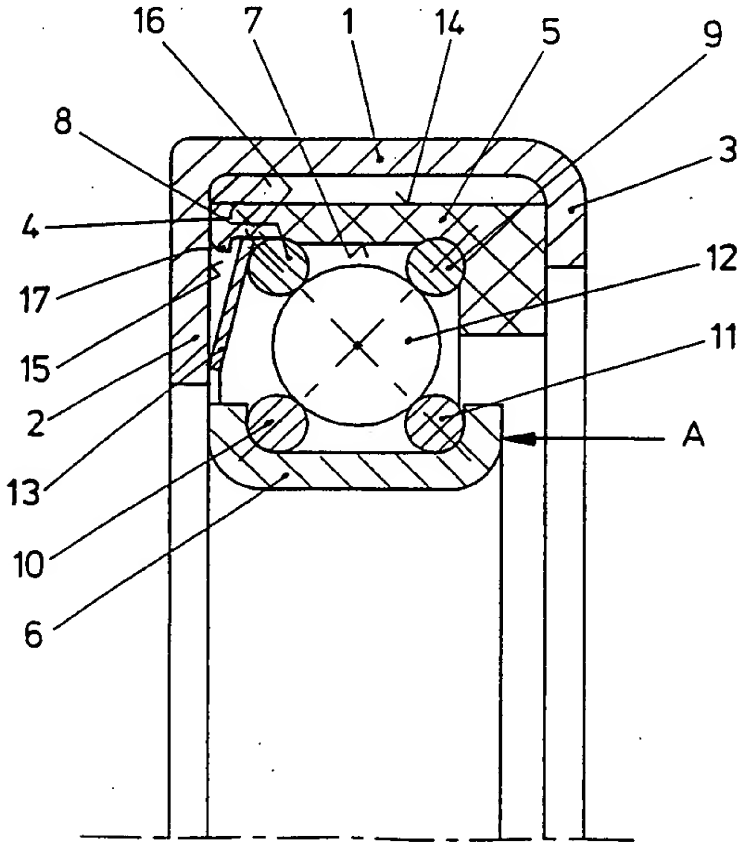
(54) Wire race ball bearing

(57) In a wire race ball-bearing, suitably for steering column mountings, two running wires (10, 11) are mounted on an inner ring (6) with radially outwardly directed flanges and two running wires (8, 9) in an outer ring (1) with radially inwardly directed flanges (2, 3), a running wire (8) being disposed for axial displacement and being biased by a spring (13) which engages a surface (15) of one flange (2). The spring (13) is in the form of a dished ring and is sufficiently pre-tensioned in an axial direction that the peripheral surface (16) of the spring is disposed to bear on a surface (7) of a resilient element (5) inserted between the peripheral surface (16) and the bore (4) of the outer ring (1). The element (5) may be of rubber.



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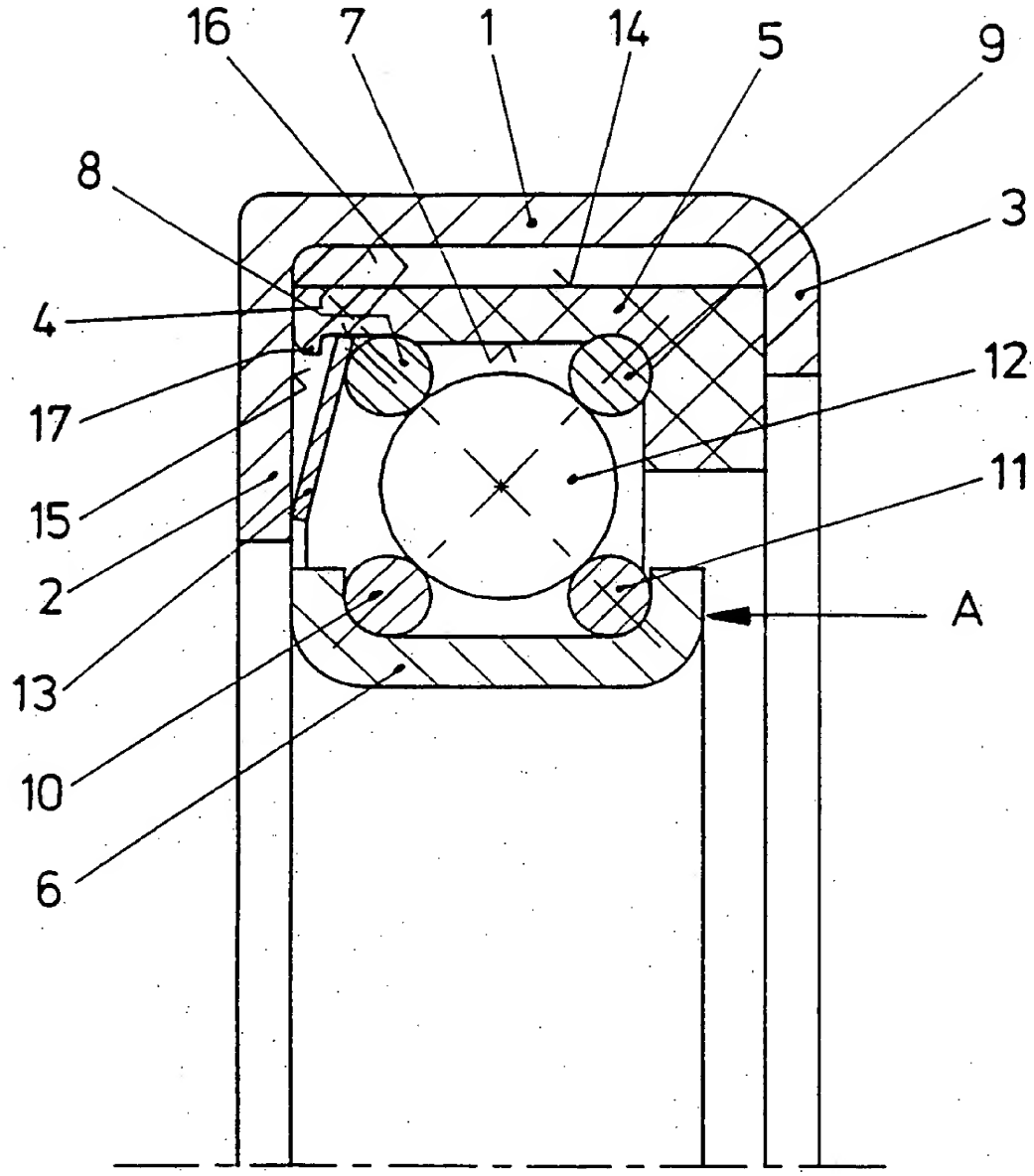
16
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A WIRE RACE BALL-BEARING

The present invention relates to a wire race ball-bearing, suitably for steering column mountings.

It is known to produce wire race ball-bearings consisting of two inner running wires which are braced on an inner ring with radially outwardly directed flanges and two outer running wires which are braced in an outer ring with radially inwardly directed flanges and the rolling bodies, one running wire being disposed for axial displacement and being biased by a spring biased on one surface of the flange.

In view of the disclosure of GB-PS 1 007 191, it is no longer novel to set the bearing parts by means of an outwardly clamping spring with a conical bearing surface which is braced on a correspondingly conical surface of the outer ring and which urges the running wire against the balls and the balls against the other running wires. This prior art device consists of a series of individual parts and is relatively expensive to produce. Furthermore, relatively strong springs are required for adjustment of the bearing parts, so that the bearing does not move smoothly enough for many applications.

The invention is based on the problem of providing a wire race ball-bearing of the type mentioned at the outset, which can be produced at a favourable cost and which offers satisfactory smoothness of movement.

According to the present invention there is provided a wire race ball-bearing comprising two radially inner running wires which are mounted on a radially inner ring with radially outwardly directed flanges, two radially outer running wires which are mounted on a

radially outer ring with radially inwardly directed flanges, and rolling elements, one running wire being mounted for axial displacement and being biased in an axial direction by a spring, wherein the said spring is a ring of resilient sheet material which is dished and is disposed between one running wire and one flange, the spring being subjected to an initial tension in an axial direction such that a radially outer surface of the spring bears against a surface of a flexible element disposed between the said outer surface and the bore of the radially outer ring.

As a result of this developed embodiment, a relatively weak plate spring can be used for adjustment of the bearing parts, since, as it presses flat, the plate spring engages into the resilient element. This produces a spring characteristic of the entire spring system which corresponds to that of a stronger plate spring, ie. a relatively considerable force is required to displace the inner ring.

According to a further feature of the invention, the intermediate sleeve is provided at one end with an encircling radially inwardly directed projection which under maximum axial loading, defines the displacement path of the plate spring and serves as an additional damping.

Advantageous further developments of the invention are described in the sub-claims.

The invention will now be described, by way of example, with reference to the accompanying drawings, which shows an axial section of a ball-bearing according to the invention.

The wire race ball-bearing shown in the drawing consists of an outer ring 1 which is constructed from sheet metal and has two radially inwardly directed flanges 2, 3, an intermediate sleeve 5 disposed in the bore 4 of the outer ring 1 and made preferably from rubber, an inner ring 6 of U-section, two running wires 8, 9 resting on the bore surface 7 of the intermediate sleeve 5, balls 12 which are located between the running wires 8, 9, 10, 11, and a plate spring 13 in the form of a dished ring which presses the running wire 8 against the balls 12 and the balls 12 against the other running wires 9, 10, 11. The intermediate sleeve 5 is of L-shaped cross-section and has on its outer shell axially directed grooves 14 which render the intermediate sleeve 5 flexible in a radial direction.

Upon assembly of the bearing, firstly the bearing parts 6, 8, 9, 10, 11, 12 and the plate spring 13 are inserted into the bore 7 of the intermediate sleeve 5 and then the entire unit is pushed into the outer ring 1 which is provided with a radially inwardly bent-over flange 2 on just one side initially, until the plate spring 13 comes to bear on the side faces 15 of the flange 2. For ease of movement of the bearing, only a slight axial clamping of the bearing parts 8, 9, 10, 11, 12 is required of the plate spring 13. This is achieved in that a relatively thin plate spring 13 is used. This thin plate spring 13 does however have the disadvantage that the inner ring 6 of the bearing can be moved too easily in the direction of the arrow A. To prevent this, when the bearing is assembled, during which the second flange 3 is flanged over radially inwardly, the plate spring 13 is initially tensioned

sufficiently axially that its periperal surface 16 comes to bear on the bore surface 7. Upon an axial loading of the inner ring 6 in the direction of the arrow A, the plate spring 13 is compressed axially via the running wire 11, the balls 12 and the running wire 8 and the diameter of the peripheral surface 16 is enlarged thereby so that it engages into the resilient intermediate sleeve 5. The intermediate sleeve 5 has at one end an encircling radially inwardly direction projection 17 which serves as an end stop for the plate spring 13.

The invention is not confined to the example illustrated. Modifications in the design of the individual component parts are readily possible within the framework of the invention.

CLAIMS

1. A wire race ballbearing comprising two radially inner running wires which are mounted on a radially inner ring with radially outwardly directed flanges, two radially outer running wires which are mounted on a radially outer ring with radially inwardly directed flanges, and rolling elements, one running wire being mounted for axial displacement and being biased in an axial direction by a spring, wherein the said spring is a ring of resilient sheet material which is dished and is disposed between one running wire and one flange, the spring being subjected to an initial tension in an axial direction such that a radially outer surface of the spring bears against a surface of a flexible element disposed between the said outer surface and the bore of the radially outer ring.

2. A wire race bearing according to Claim 1, wherein the spring and the running wires bear on a surface of the bore of a flexible intermediate sleeve.

3. A wire race bearing according to Claim 2, wherein the intermediate sleeve has at one axial end thereof a radially inwardly directed projection.

4. A wire race bearing according to Claim 3, wherein the projection serves to define the maximum deformation of the spring in one axial direction.

5. A wire race according to any one of Claims 1 to 4, wherein the intermediate sleeve is of L-shaped cross-section and has axially directed grooves on its radially outer surface.

6. A wire race ball bearing constructed, arranged and adapted to operate substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

Examiner's report to the Comptroller under Section 17 (The Search Report)

9120120.2

Relevant Technical fields

(i) UK Cl (Edition K) F2A (AD32; AD66)

(ii) Int Cl (Edition 5) F16C

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

B B CASWELL

Date of Search

10 JANUARY 1992

Documents considered relevant following a search in respect of claims 1-6

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 1007191 (AUTOSET)	

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Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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